

KNOWLEDGE

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YOUTH MOVEMENTS



Weary hikers 'sign in' for the night at a youth hostel

A CENTURY and a half ago there were no youth movements as we know them today. The reason was simple – children just did not have time to belong to them. In Britain children in the towns worked 14, 15, and even 16 hours a day; in the country children worked as long as adult farm labourers, while rich children with their toys, nannies, and schooling did not need to indulge in organised group activities.

In the course of the 19th century a dramatic change occurred. First young children ceased to work in factories, then they had to go to school; the relatively short school hours left them with much time to themselves. How were they to spend this time? Was not there a danger that with their parents at work children might get into bad company or at least become bored and inactive? One answer came from those who thought that young people should be organised into groups and both benefit and enjoy themselves in activities not open to a child on its own. The major youth movements which resulted from this way of thinking have no fewer than 2,000,000 members in Britain today.

Previous page: Scouts of all nationalities gathered at a Jamboree

These youth movements were begun solely by well-intentioned people who gave their time voluntarily and unpaid. Indeed all British youth movements were voluntary until 1939, when the government undertook a direct responsibility for youth welfare and set up youth centres through local education authorities. Since then state-run centres and voluntary organisations have existed side by side.

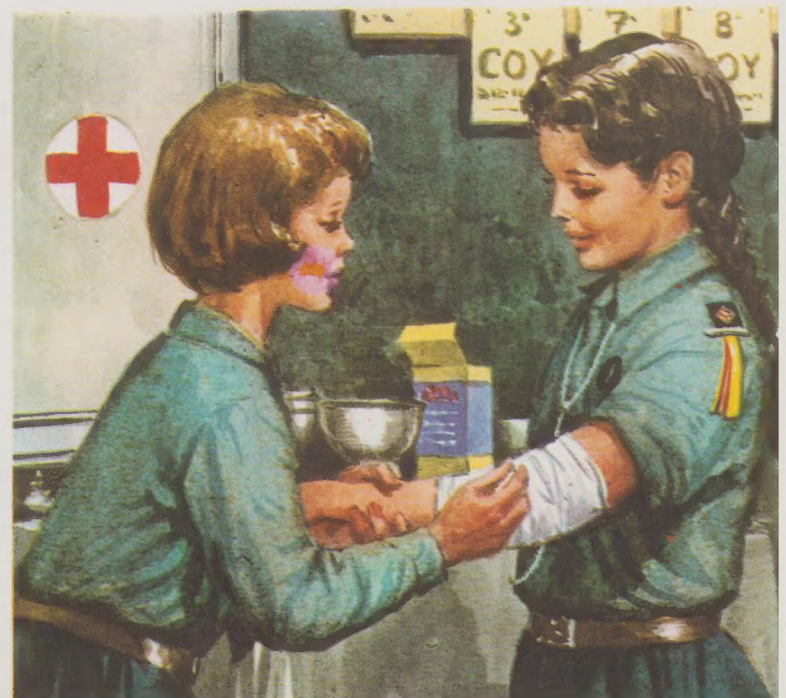
Let us look at a few of the main youth movements in Britain today.

Religious youth movements

Youth movements originated as a desire to keep young people 'on the right lines', so it is not surprising that many of them are of a strongly religious character. Foremost among these are the Young Men's Christian Association, founded in 1844 by George Williams, and the Young Women's Christian Association, founded in 1855 by Emma Robarts. These movements have flourished for over a century, and today the YMCA has 36,000 members under 21, and its sister movement has 20,500.

At first the Young Men's Christian Association met only for religious services, discussion groups, Bible study meetings, and prayers, but these activities soon expanded to include lectures and discussions on literary and scientific subjects. By 1855 the movement had become international, and there were groups in Canada, in the United States, and in Europe. In that year the first international conference was held in Paris. By 1894 the number of branches in Great Britain had risen to over 400, and by this time its most famous work – the provision of hostel accommodation – had begun. At present there are 56 residential hostels in Great Britain and 330 YMCA centres in all. The movement did great work during the Second World War, and among its training schemes was the successful 'British Boys

Girl Guides practise first aid



SERIOUS REVERSE AT BANNOCKBURN

KING SAFE, BUT GLOUCESTER KILLED AND HEREFORD CAPTURED

From Our War Correspondent

BERWICK, JULY 25, 1314

What may well prove to be a disastrous setback to the King's attempt to assert his rights in Scotland was sustained yesterday near Bannockburn. The royal army of 20,000, including 3,000 heavy cavalry, was completely outmanoeuvred by the rebel Scottish forces under Robert Bruce.

The King himself survived the conflict, but many of the leading barons, including the Earl of Gloucester, have been killed; the Earl of Hereford has been captured and Robert Bruce is, temporarily at any rate, complete master of Scotland.

BY THE BANNOCK

The battle was fought to the south of Stirling Castle. The English took up a position with the river Bannock to their left and marshes

and pools to their right. So protected, the English commanders never thought that the Scots would attack – for the only way was head on against the cream of the English cavalry.

BRUCE ATTACKS

But on the morning of Monday the 24th the English commanders saw Bruce moving up to attack. His army consisted mainly of pikemen on foot. They were arranged in strange formations (known as *shiltrons*). These consisted of four groups of soldiers, many ranks deep, with spears and pikes pointing out in all directions looking like warlike hedgehogs.

Bruce had calculated well. The narrow battlefield gave the English no room to manoeuvre. Thus the archers could not outflank the Scots, and in any case Bruce's light

cavalry was later to drive many of the archers from the field.

The young Earl of Gloucester, Gilbert de Clare, suggested to the King that they ignore Bruce's challenge, and rest until the following day. But Edward shouted at him, calling him a coward.

GLOUCESTER'S END

Thereupon the brave Gloucester leaped on to his horse, without donning his surcoat, which would have distinguished him, and rode at the head of his troops into the Scottish ranks. The pikemen held their ground and Gloucester was among the first to fall.

Having repulsed the first charge, the Scots advanced again. The huge English army had no room in which to manoeuvre, and soon the Scots, in perfect formation, were causing havoc in the confused English lines. The English archers tried to reach the Scots by firing over the heads of their own men, and many hundreds of Englishmen fell from arrows fired by their own archers.

ENGLISH FLEE

Other English tried to flee the field, only to be drowned or suffocated in the pools and marshes. Others fled backwards and were drowned in the Forth. All was confusion, and many thousands of Englishmen were slain. King Edward himself, who did not take part in the battle, had to defend himself against a group of Scottish knights. Later, after being refused admission to Stirling Castle, he made his way to Dunbar where he will shortly embark, presumably, for England.

THOMAS OF LANCASTER STAYS AWAY

PRIVATE ARMY MIGHT HAVE AVERTED DEFEAT

From Our Political Correspondent
LONDON, JULY 25

A notable absentee from the English ranks yesterday was Thomas, Earl of Lancaster, Leicester, Derby, Salisbury and Lincoln. Thomas of Lancaster is the most powerful baron in England and Scotland, and his personal retinue is probably the largest standing army ever seen in this country.

It is now known that Lancaster refused to join the King's army for his Scottish campaign. This refusal emphasises the deep enmity between the two men. Lancaster is the leader of the Ordainers, the group of barons who three years ago imposed Ordinances on the King which were designed to reform his government. Edward has forgiven Lancaster neither for the part he played in the imposition of these Ordinances nor for causing the death of his favourite, Piers Gaveston. On the latter occasion the Earl of Warwick (who was also absent from Bannockburn) seized Gaveston and had him executed with Lancaster's connivance on Lancaster's estate. It was only because of strenuous peacemaking efforts by the late Earl of Gloucester that serious trouble and perhaps civil war was averted.

PRIVATE TREATIES

Lancaster has never co-operated in the King's drive against the Scots. He has constantly made private treaties with them to prevent his own estates from being ravaged.

With Gloucester's tragic death and the humiliation of the King, Lancaster's position is even more powerful than before. It may well be that a trial of strength between Lancaster and King Edward will take place in the near future.



Before the battle Robert Bruce reviews his shiltrons which were to cause such havoc in the English ranks

KING REFUSED ENTRY TO STIRLING

CASTLE WILL SURRENDER TO SCOTS

FROM OUR STIRLING
CORRESPONDENT

It is now known that King Edward was refused admission to Stirling Castle by its English garrison. He had fled there after his defeat at Bannockburn. The first object of the King's Scottish expedition had been to relieve this very castle.

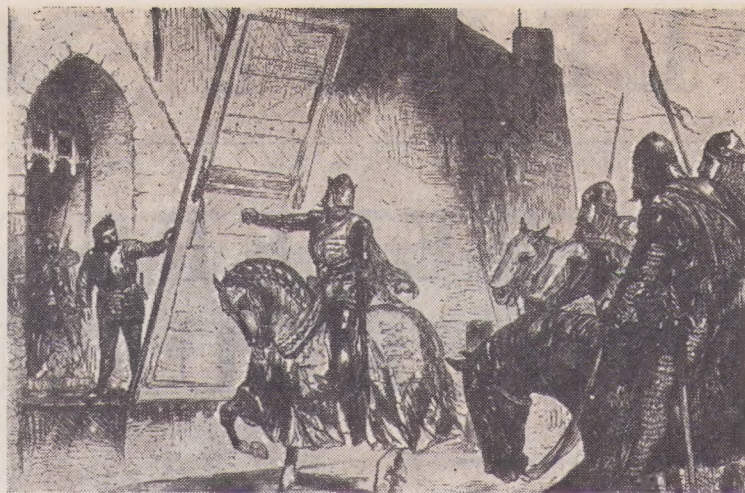
Stirling was the last important castle in Scotland held by the English, and this spring it was besieged by Edward Bruce, brother of Robert. The English commander of the castle, Philip Mowbray, agreed with Edward Bruce to abandon the castle if an English army did not arrive within three leagues of it by the 24th July, Midsummer's Day. Edward Bruce, meanwhile, allowed Mowbray to get in provisions which had become very short in the castle.

KING'S ARRIVAL

King Edward and his army arrived just in time—Edward's army, drawn up by the Bannockburn, was within three leagues of the castle and therefore Mowbray did not have to hand it over. He informed Edward that with the provisions he had obtained the castle could hold out, and there would be no question of having to fight the Scots, whose army at Stirling now included Robert Bruce himself. But Edward decided to fight—and lost the battle. The English garrison has now, it seems, decided to surrender the castle to the Scots; thus the English will have no important foothold left in Scotland.

ENGLISH TREASURE CAPTURED

The enormous treasure taken to Scotland by King Edward has fallen into the hands of the Scots, following the English defeat. The treasure included gold and silver chalices and quantities of valuable furniture, ornaments, vestments and jewellery. The loss runs into many thousands of pounds.



King Edward is refused admission to his castle at Stirling by the English garrison there

HOME NEWS

ILLEGAL HANGING PRIOR IS CONVICTED

FROM OUR LEGAL CORRESPONDENT

The Prior of Bodmin has been convicted of illegally hanging Robert, a horse-thief. It has been alleged that the theft was committed outside the Prior's jurisdiction and that the King's Coroner was not present at the hanging. For the rightful exercise of infangenetheof—the right given to some lords to hang a thief caught red-handed—the crime must be committed within the lord's jurisdiction and the King's Coroner must be present at the execution.

HUE AND CRY

In evidence given before Justice Spigurnel it was stated that a certain John had come into the Bodmin market-place and found a horse which he recognised. It had been stolen from his house the previous night. But the horse was

not alone; it was with a man called Robert. John raised the 'hue and cry' (the official summoning of all citizens to track down and arrest a criminal), and later both men appeared at the Prior's Manor Court. Robert confessed, and the steward of the court ordered him to be hanged—which he was. Justice Spigurnel decided that the Prior had no right to take such action, for Master John's house was outside the Prior's private jurisdiction.

FLOUTING LAW

He found the Prior guilty on two counts of unlawful exercise of infangenetheof. However, he suspended judgement, remarking that he must have time to ponder over such a grave flouting of the King's law, and in deciding how much to fine the culprit.

CATTLE CAUSE RUCTIONS AT TOOTING BEC

William Shaw, a villein on the Manor of Tooting Bec, pleaded guilty in the Manor Court yesterday to permitting his cattle to stray on to his neighbour's crops and allowing them to pasture on someone else's land. The damage was fixed by the court at three shillings, and in addition Shaw was fined twopence for the offence. He pleaded innocent to a charge of driving a neighbour's cattle off the common pasture and assaulting the neighbour when he protested. Shaw was ordered 'to make his law with five compurgators'. This means that at the next session of the Manor Court he must appear with five friends who will swear

that to the best of their knowledge he is innocent. If he can do this he will be acquitted.

FINE FOR GRINDING CORN AT HOME

Peter Bradshaw, a villein of the estate of Langley, was convicted at the Hundred Court of not grinding his corn at his lord's mill, and furthermore of having a quern (hand mill) in his home. It was stated that tenants of Langley were not permitted to grind their corn at home but must pay for it to be ground into flour at the lord's private mill. Bradshaw was fined 6d. and his quern confiscated.

EARL OF HEREFORD'S BROTHER SLAIN SINGLE COMBAT WITH BRUCE

Sir Henry Bohun, brother of the Earl of Hereford, was killed in single combat with Robert Bruce on the eve of the battle. When the English arrived on the afternoon of Sunday 23rd July, he and a group of cavalymen advanced towards the Scottish lines to reconnoitre the enemy's position. Suddenly they met Robert Bruce and a group of his followers. The Scottish leader was wearing his crown over a leather helmet. The brave Sir Henry at once charged Bruce, only to be felled with one blow of the Scotsman's battleaxe. The rest of the English troops then turned and fled back to their camp.

This was the first of two misfortunes to befall the English before the battle. The other came when a preliminary attack to the east of the Scottish lines was repulsed by the Scottish Earl of Moray.

BRUCE'S SPIDER

A strange story is being told of how Robert Bruce found the inspiration to rise from being a fugitive to become master of all Scotland. Apparently he once watched a whole day as a spider tried unsuccessfully to spin a web in a difficult place. At length it succeeded. Bruce thus felt encouraged to keep on trying.

OVERSEAS NEWS

STILL NO POPE

FROM OUR ROME
CORRESPONDENT

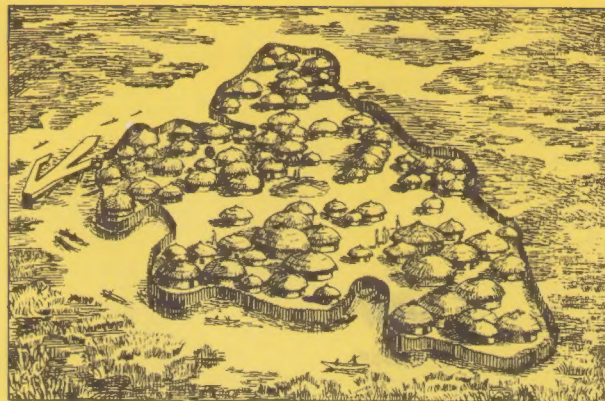
There is still no news from Rome about the election of a new Pope to succeed Clement V who died last April after a Pontificate lasting nine years. The new Pope, when he is elected, is likely to follow Clement's lead and live in Avignon; Clement, who was considered to be a pro-French pope, was crowned at Lyons and moved the papal residence from Rome to Avignon. It is understood that Clement's extravagant gifts and bequests have seriously impoverished the papal treasury.

LAKE VILLAGES



*Reconstruction
of the Glaston-
bury lake
village*

*Men building
the lake village
at Obermeilen*



HARDLY any snow fell in Switzerland during the winter of 1853. In the following spring the rivers ran very low, and the water in many lakes fell far below its usual level. Many of the farmers living on the lake shores decided to take advantage of this and set about reclaiming new land from the dried-up lake beds. They built stone and earth walls out from the normal lake edges, trapping the rich alluvial mud.

Dredging beyond their new walls, the villagers at Obermeilen on Lake Zürich found a forest of pointed wooden poles, some 12 feet long, sticking out of the mud. The poles were closely spaced together, about 100 yards off-shore, and they stretched for nearly a quarter of a mile across the bay. As the villagers dug in the mud between the posts they found pieces of wood, bone, and flint which they took little notice of; but when bronze axes and bracelets started to appear they realised that they had found something of importance. Professor Ferdinand Keller of the Zürich Antiquarian Society was asked to investigate the site, and before long he had collected a great variety of bronze axes, flint knives, and chisels (many with wooden handles), fragments of baskets, cloth, and fishing nets. As the Professor studied the wooden poles that stuck out of the lake floor he could see that they had been driven into the mud in straight rows, with cross-beams between them. They had obviously formed the supports for a platform on which houses had been built to form a large lake village. The village must have belonged to the Stone and Bronze Ages and was probably built about 5,000 years ago.

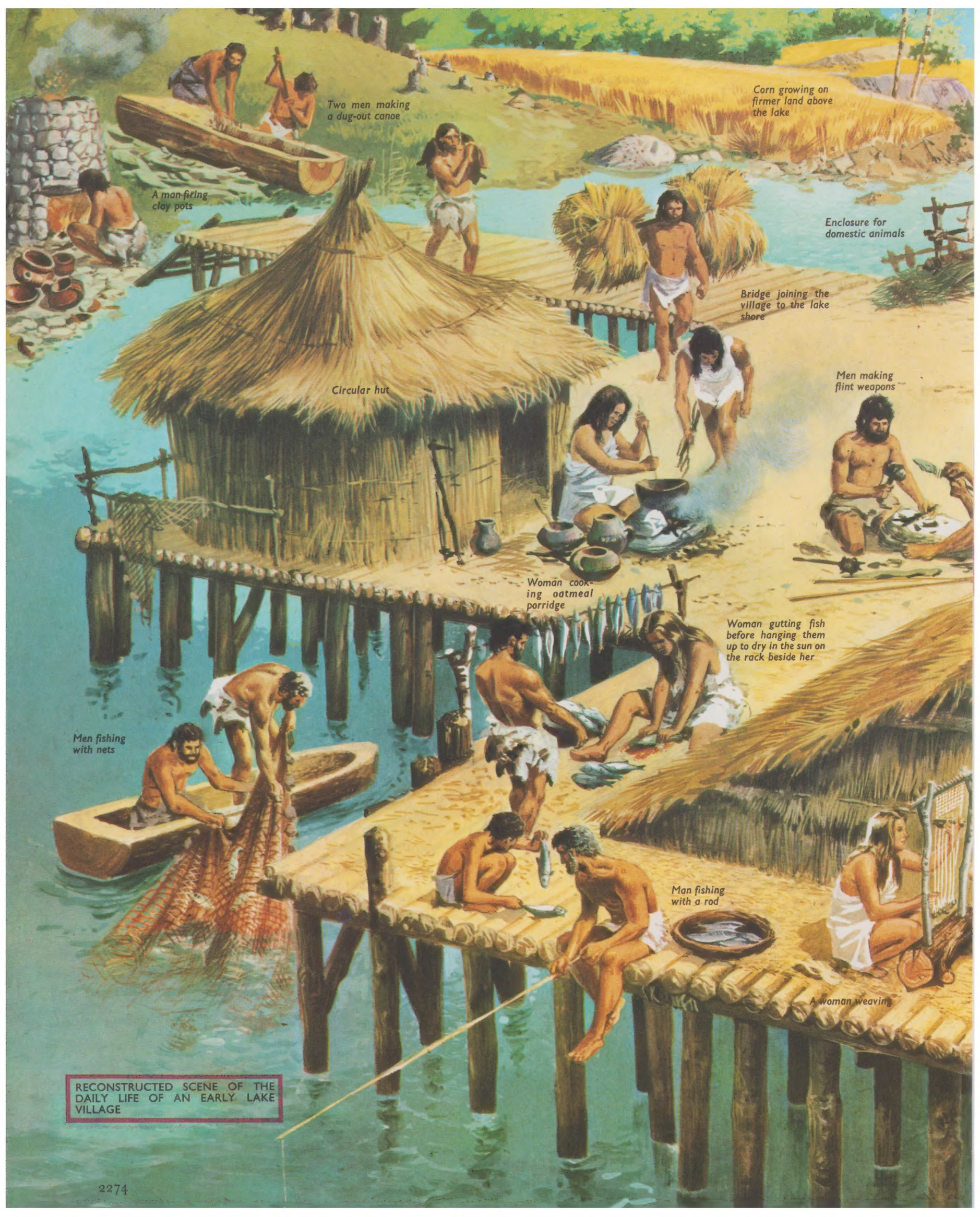
Since the discovery at Obermeilen a large number of other lake villages have been discovered in central Europe. Recently scientists have shown that the water level of the lakes has probably changed since prehistoric times, and it is likely that the villages were built on marshy land beside the lakes. Only in times of flooding would the water have come right under the timbers of the platform on which the houses were built.

MARSH VILLAGES IN ENGLAND

In the marshy land surrounding the river Brue in Somerset two Iron Age villages grew up during the last century B.C., near Glastonbury and Meare. Two artificial islands had been built by sinking palisades of posts 5 to 14 feet long into the peat and filling the interior with logs and brushwood around a core of rushes, bracken, clay, and stones. At Glastonbury about 90 huts were built on the island at different times, each between 18 and 28 feet in diameter. The floors were of clay with a central hearth of clay or stone, and the roofs, like the walls, were of wattle with a central post beside the hearth to support them. The inhabitants obtained food by hunting, fishing, breeding cattle, and growing corn and beans. They wove fabrics, made objects of wood and metal, and decorated their pottery. They used dug-out canoes and probably had carts to help them in trading tin, lead, shale, and iron objects between central England and the coast.

A bodkin and piece of fishing net from a village in Lake Constance





Two men making a dug-out canoe

Corn growing on firmer land above the lake

A man firing clay pots

Enclosure for domestic animals

Bridge joining the village to the lake shore

Circular hut

Men making flint weapons

Woman cooking oatmeal porridge

Woman gutting fish before hanging them up to dry in the sun on the rack beside her

Men fishing with nets

Man fishing with a rod

A woman weaving

RECONSTRUCTED SCENE OF THE DAILY LIFE OF AN EARLY LAKE VILLAGE



Stakes set in a semi-circle as a break-water

Conical hut

Woman scraping the fat off a hide with a flint scraper

Men stretching out an animal hide to dry in the sun

Hut with a pitched roof thatched with reeds from the edge of the lake

Two hunters returning from a successful trip

Woman grinding corn

There were many advantages in living on a lake. The inhabitants had plenty of water to drink, and were surrounded by fish and water birds for food. Animals that came to the water's edge to drink could easily be killed, and they were safe from enemies and from wild animals like the boar and wolf that roamed the forests. Of course there were disadvantages too – excessive flooding, diseases like malaria, and rheumatism caused by the damp.

THE HORSE

FOR 4,000 years man has tamed the horse and used it as a means of transport and to work on his land. The horse as we know it (*Equus caballus*) probably has ancestors in common with two kinds of wild horses: the Mongolian wild horse, called Przewalski's horse, and the Tarpan, an eastern European horse which became extinct in the 19th century. Centuries of domestication and selective breeding have produced the different types of horses which we know today.

Horses can be divided into three main classes: light horses, ponies and cobs, and heavy draught horses. Today light riding horses are by far the most common in Britain. This is because cars have superseded horse-drawn carriages and coaches, and mechanical implements are less expensive and usually more efficient than horses on the land. But in parts of both northern and southern Europe horses are still used for a good deal of farm work.

Light horses

There are two main breeds of light horses: Arab and thoroughbred. Arabs are usually quite small, seldom more than $14\frac{1}{2}$ hands in height (the hand, the standard unit of measurement of the horse, is 4 inches). They are not very fast, but are intelligent and have great staying power. Thoroughbreds, on the other hand, have been bred for speed. They are all descended in the male line from three stallions brought to England in the 18th century from the Middle East (see page 1742).

The most common riding horses in Britain are hunters and hacks. These are not specific breeds, but can be any light-legged saddle horse. Many of them have some Arab or thoroughbred blood, but cross-breeding with other types of horses has made them hardier and heavier.

Hunters must be able to jump well, and to go fast enough to keep up with hounds; they must also be strong enough to last a day's hunting. Pure thoroughbreds are excellent hunters over easy country, but cannot carry a really heavy man all day. Hacks are simply horses intended for ordinary riding.

Until the 20th century medium-weight horses were used to draw carriages, but these have now almost died out. Perhaps the most famous were the Cleveland Bays, who may have been a cross between thoroughbreds and carthorses. They were very strong and had great staying power. Hackneys, which have a characteristic high-stepping gait, were very popular as high-class carriage horses.

HORSES' COATS

Horses' coats are smooth and hairy; in the winter they grow thicker undercoats which they shed in spring. Some are much shaggier than others.

Horses are often referred to by the colour of their coats.

Blacks have black coats, manes, and hooves.

Chestnuts have coats that are yellow in different degrees of intensity.

Bays are deeper coloured with more brown or mahogany and usually have black legs, manes, and tails.

Greys can be of various shades, from quite dark to white.

Piebalds have patches of black and white.

Skewbalds are white and brown.

A yellow horse with black points is a *dun*; *roans* have white hair mixed in with their basic colour.

black



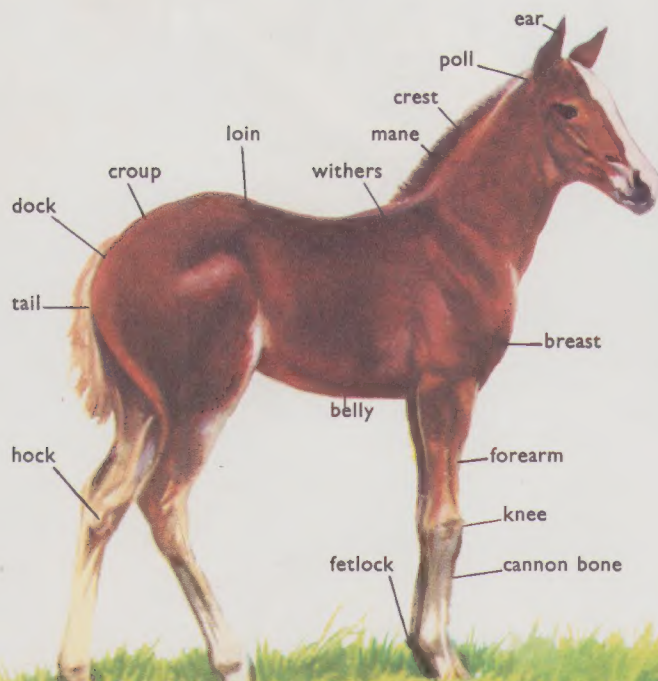
chestnut



bay



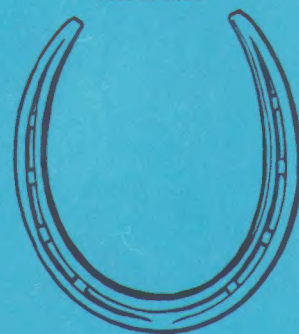
grey



HORSE SHOES

An old saying goes: 'No foot; no horse', and the foot is indeed a vital part of the horse's anatomy. The practice of shoeing horses with iron as a protection against the wearing away and cracking of the edges of the hoof grew up in about the 10th century. Shoes vary according to the size of the horse and the work it is required to do. They are nailed into the insensitive lower part of the hoof by the blacksmith, who shapes the shoe specially to fit the individual horse.

Horse shoe



Ponies and cobs

Ponies are chiefly distinguished from horses by their smaller size. Cobs are larger than ponies and smaller than horses. They generally originated in mountain and heathland districts, from which the various British breeds take their names. One of the oldest British breeds is the Shetland; these tiny ponies from the bleak north are only about 10 hands in height, but they are very strong and hardy and make very good pack animals. They are popular with small children because of their size.

The most popular of all ponies among children are Exmoors, Dartmoors, New Forest, and Welsh. They are about 12½ hands and are very hardy. Both breeds are brown, and Exmoors have characteristic lighter 'mealy' muzzles.

BY-PRODUCTS

Horse-meat is only used for feeding dogs in Britain, though it is eaten by humans in some parts of the world. Horse hide is tanned and used as leather, and horse hair is used for violin bows, and for weaving into such fabric as chair-seat covers. Glue comes from the tissues and bones of horses.

Welsh mountain ponies are about the same size as Exmoors; Welsh cobs, which are stockier than the ponies, are between 13½ and 14½ hands. A cross between these cobs and thoroughbreds makes a very good hack. Other British breeds of ponies include New Forest, Fell, Dales, and Highland.

Draught horses

Draught horses, often referred to as carthorses, are becoming increasingly rare in Britain. They are large and heavy, some with silky 'feathers' of hair on their heels, and are probably descended from the heavy horses which were bred in the Middle Ages to carry knights in full armour. They are 16 or 17 hands in height, enormously strong, and usually very gentle. There are fewer draught horses in Britain now that most farms have become mechanised.

The chief breeds of draught horses are: Shire, the largest (a Shire horse can weigh more than a ton and pull five times its own weight); Clydesdale, a Scottish breed; Suffolk, or Suffolk Punch, a chestnut horse with a short, strong neck and no 'feather' on its heels; and the Percheron, a breed which originated in the Perche district of northern France.

Keeping a horse

Most horses can be kept outside all the year round in Britain if they are given enough to eat; if they are kept in they should be given about two hours' exercise a day to keep them really fit.

Horses eat hay, oats, and bran (amounts vary according to the size of the horse), and drink from five to 15 gallons of water daily.

How long does a horse live?

Horses generally live to be about 20 years old, although some have been known to reach the age of 40.

A young horse is called a foal – a colt foal if it is male, a filly foal if it is female. From one to three years old they are called simply colts and fillies; when they are older they are stallions or geldings, and mares.

CLASSIFICATION

Species:	caballus
Genus:	Equus
Family:	Equidae
Sub-Order:	Perisso- dactyla
Order:	Ungulata
Class:	Mammalia

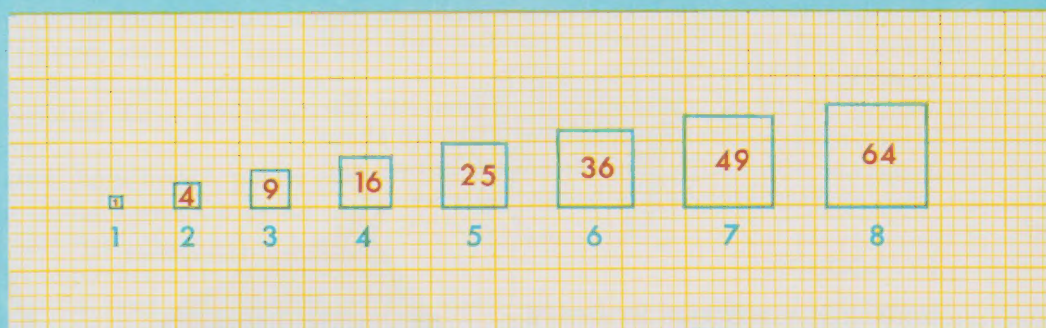


GRAPHICAL COMPUTERS (PART ONE)

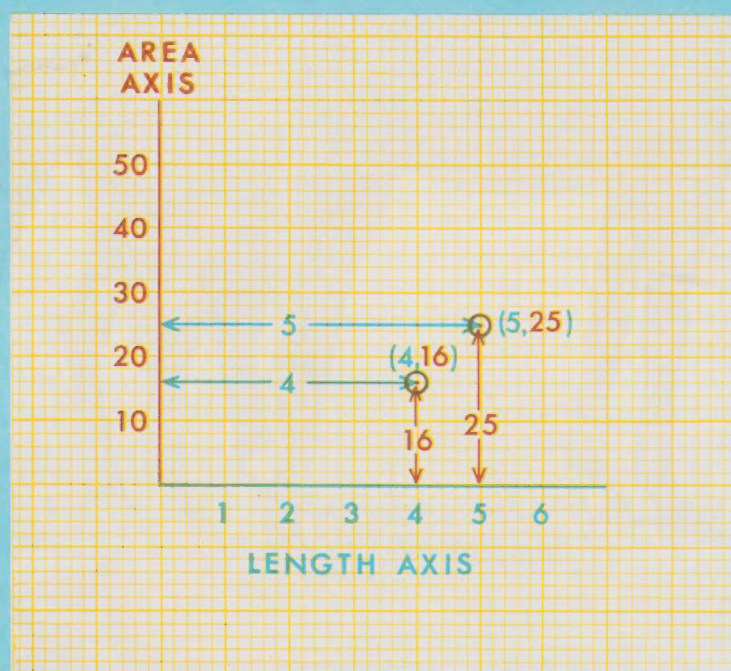
GRAPHS are commonly used nowadays to convey information, and if you look through newspapers you will see many different examples of them. But graphs can also be used as an aid to calculation (computing), as we will see.

GROWTH OF SQUARES

In diagram 1 you can see how the area of a square grows as the length of its side increases one unit at a time. We could summarise the information by making a list of number pairs: (continued below)



①



②

(1,1) (2,4) (3,9) (4,16) (5,25) (6,36) (7,49) (8,64) and so on, the first number indicating the length of the side and the second the area of the square.

With each of these number pairs we can associate a point on a piece of graph paper as is shown in diagram 2.

We start with two numbered lines called axes at right angles to each other. The first number of our pair indicates the distance of the point to the right of the red line, measured with reference to the black number scale. The second number shows the distance above the black line, measured with reference to the red number scale.

All our number pairs could be plotted in

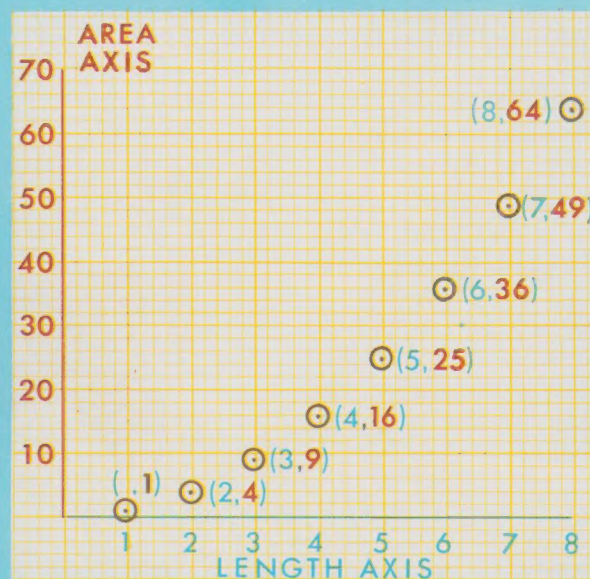
the same way, and a geometrical pattern is clearly formed (diagram 3).

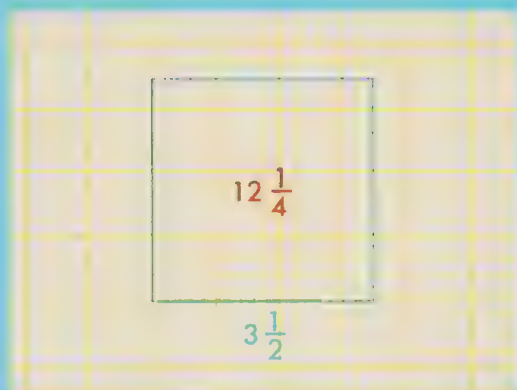
There is, however, no reason why the sides of squares should not be fractional (diagram 4).

There are $12\frac{1}{4}$ small squares in a square with sides $3\frac{1}{2}$ units, so $(3\frac{1}{2}, 12\frac{1}{4})$ is also one of our number pairs, and if the corresponding point is plotted on a graph it also fits in with the general pattern. There is an infinity of possible number pairs, and if all the associated points are plotted, they form a curve which is shown in diagram 5.

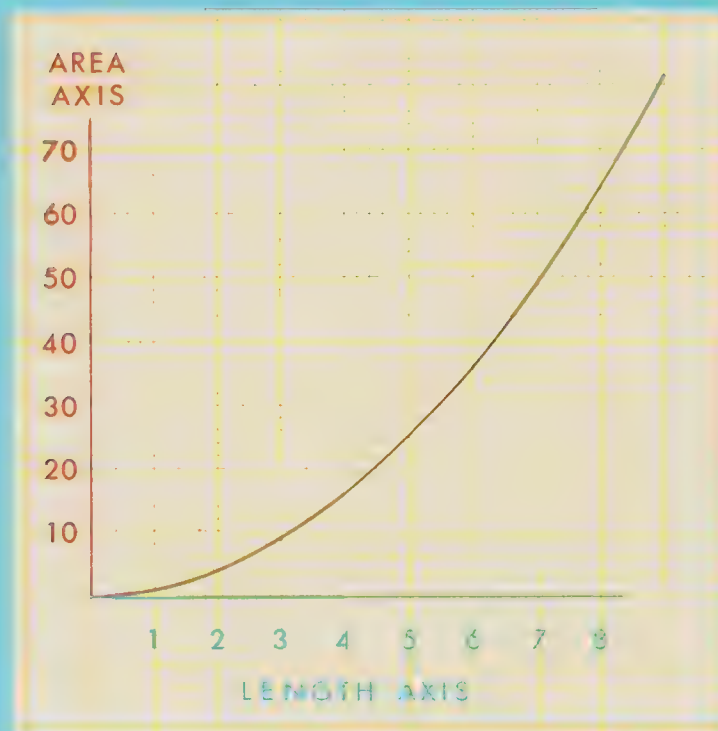
This curve may be used in calculation. Suppose we wished to know the area of a square whose side was 4.6 units long. We require the second member of the number pair $(4.6, ?)$. Its related point P on the graph can easily be found, as it is 4.6 units to the right of the red axis (diagram 6). The second number can now be read off from the graph as approximately 21.2. So we have deduced that the area of

③





④



⑤

the square with side 4.6 units is 21.2 sq. units.

Noticing that the red number of any pair is the square of the black number, we realise that we have also calculated $(4.6)^2$. In fact squares of any numbers may be read off from the graph or its extension. Try finding $(2.5)^2$, $(3.5)^2$, $(7.6)^2$.

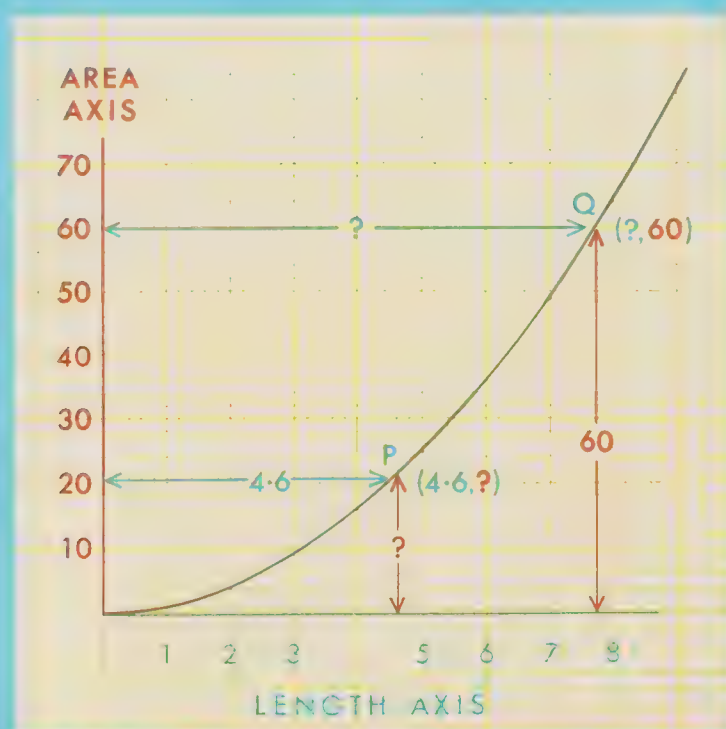
If we want to know, for example, the

square root of 60 or the side of a square whose area is 60 square units, we require the first number of the pair: $(?, 60)$. The corresponding point is also shown on the graph, from which we deduce that the first number is approximately 7.7.

7.7 is, therefore, the approximate square root of 60, and the side of a square of area 60 square

units is approximately 7.7 units in length.

Now use the graph to compute other squares and square roots. Also, when you have mastered this, try to draw another graph that will enable you to find cubes and cube roots. Then you can draw graphs for the other indices. It is quite easy if you follow the same methods.



⑥

J A M A I C A

LEGEND has it that when Columbus was asked by Queen Isabella of Spain to describe Jamaica, he crumpled up a small piece of paper and tossed it on to a table. 'It looks like that, Your Majesty,' he said. It was an apt description, for Jamaica is extremely rugged and mountainous. Its eastern ranges have rugged peaks and deep, hidden valleys, covered with dense rain forests. Blue Mountain Peak, in those ranges, reaches a height of 7,402 feet above sea level. Forests cover a quarter of the island, and the whole country is veined with rivers flowing north and south from the mountain spine. Many of these rivers dry up in the summer. Even so, the aboriginal Arawaks, a peace-loving, agricultural tribe of South American Indians who inhabited the island from about A.D. 1000, called it *Xaymaca*, or 'land of wood and water'. It is from this word that the name 'Jamaica' is derived.

Jamaica lies in the Caribbean Sea, 17° north of the Equator, some 90 miles south of Cuba, and 180 miles south-east of Florida, the nearest point on the North American mainland. Its greatest length from east to west is 146 miles, and from north to south 51 miles. The area of the island is 4,411 square miles, with a population numbering approximately 1,600,000, of mixed blood, the majority being of African descent.

Pioneers and pirates

Jamaica was not 'discovered' until 1494, when Christopher Columbus made his first landing at Puerto Seco (now Discovery Bay). Soon after this the Spaniards began their occupation of the island, which they used as a base from which to make expeditions to the mainland of North America.

In 1509 Columbus's son, Diego, given the title Lord of Jamaica, ordered the first official Spanish settlement. In the following year the first capital of Jamaica was founded in Seville (near St Ann's Bay). In 1534 a second one was built at St Jago de la Vega (now Spanish Town).

It was in the 17th century that Jamaica came under British rule. In 1655 Admiral Penn and General Venables had been sent to the West Indies by Cromwell, with orders to capture the rich, Spanish-held island of Hispaniola. After a humiliating rout the expedition sailed west, and on 10th May landed on nearby Jamaica, and took St Jago de la Vega. The Spaniards capitulated, hiding their valuables and freeing their slaves, who fled to the desolate Cockpit Country of the central mountain plateau, from where, for the next 80 years, they waged ceaseless guerrilla warfare against the British. They became known as the Maroons (from the Spanish *cimarrones*, the wild ones).

During the 17th and 18th centuries Jamaica was not only a key point in several British wars against the Spanish empire in the Americas, but it was the headquarters of the buccaneers and pirates who infested the Caribbean at that time. The Port Royal peninsula (which protects Kingston Harbour, one of the finest natural harbours in the world) was the focal point of such rascally characters as Henry Morgan, Anne of the Indies, and Blackbeard. Port Royal became known as 'the wickedest city on earth'. Morgan was its master, and for his 'services' against the Spaniards he was knighted by King Charles II and appointed Governor of Jamaica. As governor he had to hang those of his former comrades who would not give up their piracy. Morgan died in 1688, and later an earthquake knocked down the greater part of Port Royal; many hundreds

lost their lives, and over £1,000,000 of treasure sank into the sea – even Morgan's grave disappeared. All that remains as a memorial to him is, ironically, a grandiose set of solid silver Communion plates, which he had presented (in repentance of his sins, perhaps?) to the church at Port Royal.

Slaves for sugar

During the first 200 years of British settlement the government of the island was in the hands of a small, wealthy planter class whose fortunes were made by the cultivation of sugar cane. The demand in Europe for sugar increased rapidly, and the west coast of Africa was plundered for negro slaves to work on the plantations. A coarse, brutal society grew up in Jamaica. The master was corrupted by greed, the slave by oppression and the threat of the overseer's whip. Despite this, intermarriage between white planters and negroes frequently occurred, and this brought a new type of 'native' Jamaican – the coloured – into being. In 1739 the planters signed a treaty granting the Maroons their freedom, the right to govern themselves, and complete possession of their lands. This treaty still holds, and today the descendants of those proud communities live their own lives in the Cockpit Country, apart and aloof from their fellows.

In 1834 came the general abolition of slavery in all British territories. The freed slaves left the plantations in great numbers and set up smallholdings and farms, and it is these groups of peasants who still form the largest section of the population, and who remain today the decisive element in the island's political and economic life.

Labourers were brought from India and China to replace the slaves and work on the sugar plantations, and further intermarriage added to the complication of the island's society.

Jamaica today

The 100 years following emancipation were turbulent ones. The racial tensions and political and economic inequalities between black and white resulted in continuous riots and disturbances. However, constitutional, electoral, and economic reforms took place over the years, gradually easing the situation.

In recent years two Jamaicans emerged as leaders and reformers, taking up the cause of the underprivileged: Mr Norman Manley and Mr Alexander Bustamante. The former founded the People's National Party and campaigned for universal adult suffrage; the latter founded the first industrial trade union and the Jamaica Labour Party. In 1957 full self-government was conferred, and on 6th August 1962 Jamaica attained full independence, and became a Dominion within the Commonwealth, with Sir Alexander Bustamante as its first Prime Minister.





A peasant takes a few breadfruit, grown in his back garden, to market. On his shoulder he carries sugar cane



Kingston, the capital of Jamaica

A new economic structure has emerged in the last decade. Jamaica has become the world's largest producer of bauxite (from which the metal aluminium is made), and over half the island's revenue comes from the export of this mineral. The export of sugar, rum, and molasses is the second largest contributor to the economy, with the ('invisible export') tourist trade third. Other export crops are bananas, citrus, coffee, and cocoa – agriculture is the biggest employer of labour.

The tourist will find Jamaica an island of great scenic beauty, with superb mountain views, sandy, palm-fringed beaches, and warm turquoise seas. Exotic flowers and fruit grow in lush profusion. Montego Bay, Ocho Rios, and Port Antonio are the principal seaside resorts, and have excellent hotels and first-class facilities for enjoying every type of water sport. Mandeville, 2,600 feet up in the hills, is one of several delightful cool inland resorts, where exploring the beautiful countryside on horseback or on foot along the winding muletracks is a favourite pastime. It is the centre of the fruit district, where bananas, coconuts, pineapples, oranges, tangerines, mangoes, and paw-paws flourish in the fertile soil.

Animal population

The only indigenous wild animal is the agouti, which lives in the Blue Mountains, where the wild boar, descended from the domestic pig introduced by the Spaniards, is also found. Crocodiles were once so numerous that a crocodile was incorporated in the island's coat-of-arms, but they have been hunted almost to extinction. The mongoose is found in large numbers throughout the island. Birds include the parrot, parakeet, blue partridge, wild duck, and the tiny but gorgeous humming bird.

More facts about Jamaica

Jamaica has many schools and technical colleges, and is the home of the University of the West Indies situated at Mona. It offers degrees in Art, Medicine, and the Sciences; the Agricultural and Engineering Faculties are situated in Trinidad.

There are two international airports in Jamaica, one at Montego Bay, the other at the Palisadoes, Port Royal, where BOAC, Pan-Am, KLM, and Trans-Canada operate.

There is a Government Broadcasting Corporation, and a commercial company, Radio Jamaica Ltd., both relaying transmissions from the BBC.

The colours of the new National Flag of Independence are black, gold, and green. The black symbolises hardships, the gold sunshine and natural wealth, and the green hope and agricultural resources, summed up in the saying: 'Hardships there are, but the land is green and the sun shineth.'

Sugar cane, the principal crop, is loaded into an ox-cart



Map of Jamaica



HOUSES IN EUROPE

MOST of us have some idea of what the Eiffel Tower in Paris, the Colosseum in Rome, or the Parthenon in Athens looks like. But there is another type of architecture which, although less spectacular, can teach us far more than such famous monuments about a country and the way of life of its people – domestic architecture. It is not only Englishmen whose homes are their castles; houses are the centre of family life in every country in the world. We can guess a man's standard of living, the sort of life his family leads, and sometimes even his occupation from his house.

Two factors above all have influenced the character of buildings: climate, and natural building materials. It is largely because Europe has a great variety of both these that European domestic architecture covers a very wide range of styles. In the colder climate of northern Europe home life is concentrated indoors, and so interior decoration tends to be more ornate than in the south, where elaborate fireplaces, for instance, would be quite out of place. The warm climate of the Mediterranean countries, on the other hand, enables the people to spend long hours out of doors. So in this area, although the interiors are often starkly simple, we find sheltered balconies, porticoes, cloisters, and patios; shutters provide protection from the sun, and whitewashed buildings reflect its heat.

Until about 150 years ago houses merged naturally into the surrounding landscape, for they were almost bound to be made of local materials. Even today in Britain cottages in the Cotswold Hills are built of Cotswold stone and tiles; in North Wales stone cottages with slate roofs have been made from nearby quarries; and in the south-east we find many half-timbered and beamed houses, for this district was once extensively wooded. Again, in Provence in southern France, and in Tuscany and Umbria in central Italy, cottages are built of local stone. Scandinavian countries, with their miles of fir forests, have a tradition of building in wood.

Until quite recently houses in parts of Europe looked quite individual. You could always distinguish a German house from a French house. But starting in the 19th century, a great change came over domestic architecture. The development of concrete and steel as building materials meant that local materials did not have to be used, and with the widespread use of these new materials buildings came to look more alike. Town planning, made necessary by the great increase in population, has also resulted in greater similarity between buildings. Architectural styles have become much more functional – the result is that a block of flats looks much the same in Milan as in London. Of course, houses still look different from country to country: the German suburban house can usually be distinguished from the British one. And because of the difference in climates, the villa in the south of France looks different from a suburban house outside Paris. But at the same time, some of the individuality of European domestic architecture has been lost. Let us look at examples of European houses, built at a time when they still had their individual characters.



Shaded arcades and balconies protect this Spanish house from the sun

SPAIN – The arched porticoes and covered balconies of many Spanish houses show strong Moorish influence. The broad eaves protect the front rooms from the glare of the sun in summer (see diagram 1), while allowing the lower rays of the winter sun to enter (diagram 2).

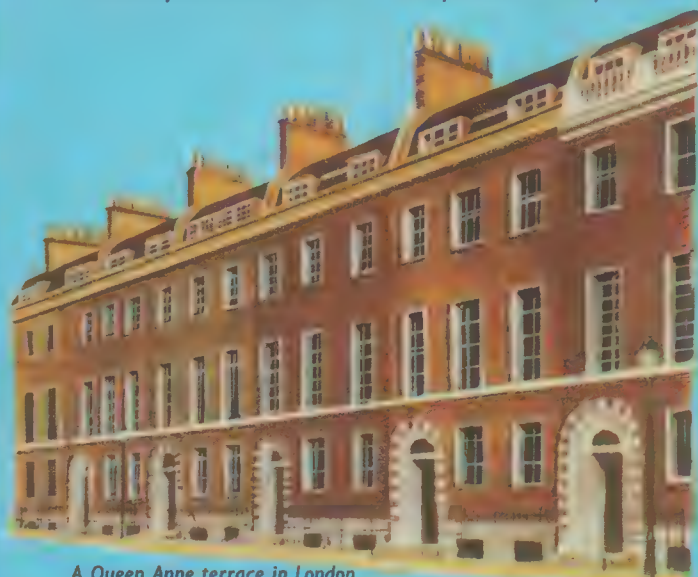


A typical 19th-century Parisian house



FRANCE – French town houses are usually tall and narrow, and built of light-grey stone, with double windows and heavy wooden shutters. Rich people used to live in detached *hôtels* like country mansions, screened off from the street; a few of them still survive, especially in provincial towns, but Paris was completely replanned by Baron Haussmann in the 1860s and much of the older city was destroyed to make way for the great boulevards.

ENGLAND – Terraced houses on plans similar to those illustrated were built in most English towns in the 18th and 19th centuries, and many still survive. They were typical middle-class homes, but not of course the only type of house to be built. In the Queen Anne and Georgian periods they were usually of red brick, but later ones were sometimes faced with stucco. The entrance led straight to the staircase, with one large front room and one back room on each floor. Service rooms were in the basement and servants often slept in the attics. The rows of chimneys allowed smoke to escape from the open fires.



A Queen Anne terrace in London

HOLLAND – These charming houses, tall, with high windows and spacious rooms, are found in all Dutch cities and are seen at their best in Amsterdam, where rows of them overlook canals bordered with trees. They are solidly built of brick, and have no basements. Dutch housewives frequently touch up the gaily coloured exteriors of their houses with fresh coats of paint. Dutch houses look far cleaner than English ones, since there is hardly any smoke or soot in the air. The typical Dutch gable of the left-hand house is often seen in East Anglian houses.



Gabled Dutch houses

ITALY – A typical farmhouse in north Italy, made of four sections enclosing a large courtyard. It houses several families of farm labourers who work on the owner's land. On one side are the living quarters (kitchens on the ground floor, bedrooms above); the remainder consists of stables and store-rooms for fodder. By shutting the gate which gives on to the road and the other leading to open country, the farm turns into a kind of fortress – a legacy from more unsettled times. The red tiles and white-washed stone are typical of Italian country architecture.



A farm in north Italy



A German chalet in the Black Forest



A Yugoslavian house showing Turkish influence

YUGOSLAVIA – At first sight this house seems to belong to northern Europe, but if you look at the windows you will see that they are screened, like the windows in Turkish or Arab houses. Yugoslavia, like Greece, was once a part of the Turkish empire, and many of the villages there still look exactly like Muslim villages, with domed roofs and mosques, reminiscent of the East.

GERMANY – The house illustrated above stands in a clearing in the Black Forest. It is built entirely of wood. The wide overhanging roof of thatch and shingles (strips of wood used as tiles) provides protection against the long snowy winter. The steep slope prevents snow and rain from lying on the roof and rotting it. The balcony on the second floor is used for drying vegetables, grain, and fruit for the winter.

GREECE – The Greek countryside is scattered with little white houses like these. The flat roofs serve as store-places, drying rooms, or places to sit in the evenings. The stone walls are dazzling in the sun, for they are whitewashed with lime to reflect the sun's rays and keep the house cool. In parts of Greece the roofs are dome-shaped, and their Turkish appearance reminds us that for centuries Greece was a part of the Turkish empire. Domes are built of brick, for timber is very scarce in Greece.



Fishermen's cottages on a Greek island

EARLY CHRISTIANITY

CHRISTIANITY developed in the cultured world of Asia Minor. At the time of Christ all the countries bordering the Mediterranean were part of the great Roman Empire, but although the Romans were pagan they made little attempt to interfere with the religions of their subject peoples. Among these subjects were the Jews, a tribe who had come from Ur at the mouth of the Euphrates. They had settled in Egypt and suffered persecution before being led out by Moses and finally into Palestine under Joshua. In Palestine they flourished under their kings Saul, David, and Solomon, and their fine capital was Jerusalem. But the Jewish kingdom did not long remain independent and by the time of Christ was a part of the Roman Empire. The Jews were not without hope. Their remarkable religion prophesied the coming of a Messiah who would restore them to their ancient glories.

Christianity was built on these foundations. Christ, according to the Christians, was the promised Messiah, although He disappointed the Jews in that His kingdom 'was not of this world'. The Jewish tradition became known as the *Old Testament*; Christian tradition became the *New Testament*. But most Jews did not accept Christ as the Messiah, so what began as a fulfilment of the prophecies of Judaism developed as a separate faith; and the Jews are still waiting for their Messiah.

Apostolic to Catholic

Christ was crucified probably in either AD 29, 30, or 33. Those who believed Him to be the Messiah numbered only a few hundred, mainly in the small area of Galilee where He preached. At first the Apostles remained in Jerusalem, regarded by the Jews as a harmless and misguided sect. They shared all their goods in common and tried to live as Jesus had taught them. But gradually they became aware of a wider mission. One young convert called Stephen went outside this group and began to denounce the sins of the Jews. He was stoned to death and became the Church's first martyr. But a new spirit had been born; the faith spread to Antioch (where the term 'Christian' first appears), Damascus, and other cities of Asia Minor.

It is an extraordinary thing



A bishop preaching to an early Christian community

that in the first years after the crucifixion Christianity made little progress in Jerusalem even though the Apostles were living there, and it was there that Christ had died. There is a reason, however; the Jews in Palestine were an isolated, haughty group loath to admit outsiders and to listen to the humble Apostles. But there were millions of Jews living outside Palestine, in Syria, Egypt, and Greece. Most of them had adopted the Greek language and were called 'Hellenists' to distinguish them from the Aramaic-speaking 'Hebrews' like Christ. They were more tolerant of non-Jews (Gentiles), and were receptive to the new religion which was preached to Jew and Gentile alike.

Above all, Christianity made its greatest-ever convert in Paul of Tarsus (see page 2096). He spoke Greek, and it was he more than any other man who made Christianity a universal (Catholic) religion with a message for all mankind. His base was Antioch, but he also preached in Macedonia (thus bringing the faith to Europe), Thessalonica, Corinth, Ephesus, and perhaps even Spain. The original Apostles, too, began to leave Jerusalem, going to India, Egypt, and Rome. In fact Christianity in that first generation after Christ made startling progress – except in Jerusalem. Here in AD 70 the Jews revolted and the Romans besieged the city. The Christian community fled. Jerusalem was ravaged and the Jewish Temple destroyed.

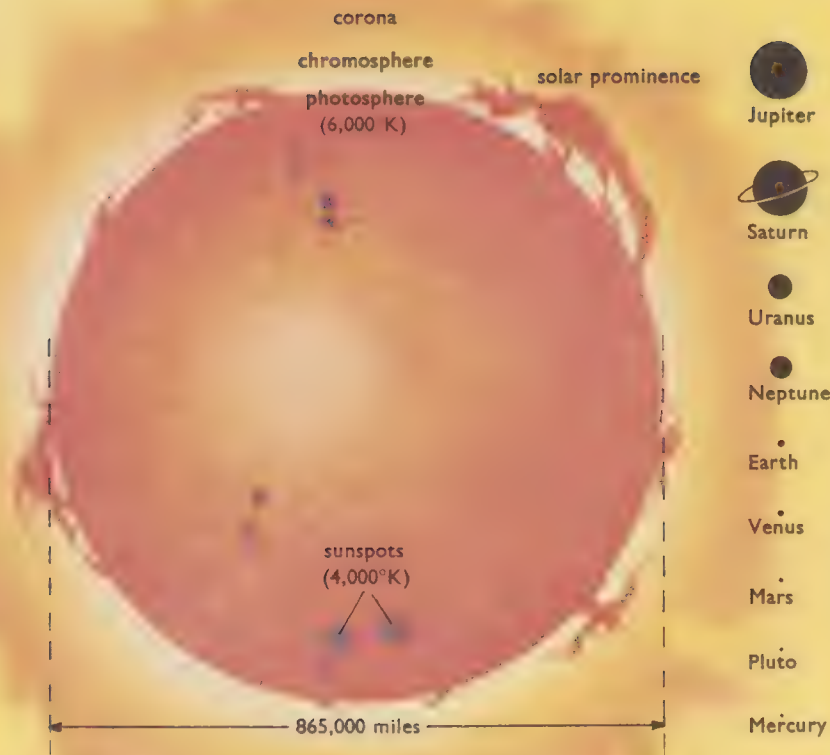
As success grew, so persecution began. Both Peter and Paul probably perished between AD 60 and 70 in the persecutions of Nero, while many Christians became food for the lions in the Roman theatres. Yet the Church, forced underground, expanded rather than contracted. The Gospels were written – the first (*St Matthew*) about AD 80, the last (*St John*) perhaps 20 years later. These, together with St Paul's Epistles, the Apostles' Creed, and a growing organisation enabled the Church to stand united against its persecutors.

Church organisation

The Apostles, clearly, were special. Some of them were able to heal the sick, and they had the power to forgive sins. But the day-to-day running of the Church communities was not in the hands of the Apostles but of the *presbyters* or elders, later called priests. Sometimes the more important elders were called *bishops* or overseers. Bishops had assistants called *deacons*. St Paul refers to bishops and deacons in his Epistles, as does St Luke in the *Acts* of the Apostles (c. AD 70). Although elected, these officers were from the beginning ordained by other bishops by 'the laying on of hands'. The bishops were considered to be the direct successors of the Apostles, able to receive and transmit their special powers such as forgiving sins.

The most important Christian centres were the cities where the Apostles had preached. Foremost were Antioch (St Paul), Alexandria (St Mark), and Rome (St Peter). Rome, being the capital of the Empire and city of the leader of the Apostles, soon asserted a claim to supremacy. Clement, perhaps the fourth Pope after Peter, is found mediating in a dispute in the Greek Church as early as AD 96. But Roman supremacy was not unreservedly acknowledged by the other 'patriarchates', and ultimately Rome and the Eastern Churches were to split into Catholic and Orthodox.

THE SUN



THE Sun is the centre of our solar system and is possibly the body from which the Earth and all the other planets originated. It is the only important source of light and heat for the Earth, and consequently it controls all forms of life. It is, nevertheless, a comparatively unimportant star situated in the Milky Way and about 25,000 light years distant from the centre of the Galaxy (1 light year is 5·8 million million miles). The Sun consists of a globe of gas which is about 865,000 miles in diameter, heated to incandescence by thermonuclear reactions in its interior. It is supposed that the temperature near the centre of the Sun may be 15,000,000°K, and on its surface the temperature is about 6,000°K. (In astronomical work temperature is measured on the Kelvin Scale, which begins at absolute zero. A temperature in degrees Kelvin is equal to the temperature in Centigrade plus 237°.)

◀ The Sun, showing the different parts of the solar atmosphere; on the right are the planets drawn to scale

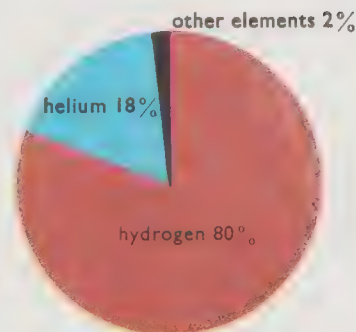


The visible part of the solar spectrum, ranging from red to violet

The structure of the Sun's atmosphere

The main body of the Sun is opaque and has a well defined visible surface or 'skin', known as the *photosphere*. This is the source of practically all the light and heat radiated by the body. Extending outwards from the photosphere for a distance of about 6,000 miles is the *chromosphere*. This is a layer of transparent gases which are in continuous movement. Its appearance has been likened to a prairie fire. Above the chromosphere and extending outwards to a height of many times the diameter of the Sun is another transparent gaseous zone called the *corona*. Neither the chromosphere nor the corona are normally visible. They can be seen with the aid of certain kinds of optical equipment attached to astronomical telescopes. The only time that they can be seen without these aids is during a total *solar eclipse*, when the body of the Moon exactly covers the photosphere and therefore obscures the brighter light radiated from it. By comparison the light radiated from the outer parts is equivalent to the brightness of moonlight.

The photosphere, chromosphere, and corona constitute the *solar atmosphere* and are the only parts of the Sun which can be observed. They all have a similar chemical composition and it seems that the composition of the Sun's interior differs little from that of its atmosphere. Although the three zones are permanent features, the boundaries between them are never clearly defined, and they are always changing internally. The most important changes are collectively called *solar activity* and include *sunspots* (dark spots) and *faculae* (bright spots) in the photosphere, *flares*, *floculi*, and *spicules* in the chromosphere, and *prominences* in the corona.



The Sun is made up of: 80 per cent hydrogen, 18 per cent helium, 2 per cent other elements.

The thermonuclear reaction of hydrogen to form helium causes the intense heat of the Sun.

The chemical composition of the Sun

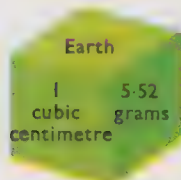
One of the most important methods of chemical analysis is known as *spectroscopy*. This involves the examination of the light emitted by an incandescent (glowing) substance (see page 530). This is done by an instrument (*spectroscope*) which is capable of splitting this light according to its different wavelengths. Since the Sun is composed of gases of very high temperatures, its composition can be studied in this way, and indeed the science of spectroscopy was largely founded upon early attempts to determine the nature of the Sun. If sunlight is allowed to shine through a narrow slit and prism and then through a lens system, this 'white' light is separated into a series of colours which range, in the visible spectrum, from red to violet. Within



Part of the surface of the Sun showing the various forms of solar



Density 1.41



Density 5.52

the spectrum there are also a large number of dark lines known as *Fraunhofer lines*. These occur at irregular intervals in the spectrum and have different intensities. Each chemical element has its own spectrum lines which allow the physicist to recognise that particular element when it is present in an incandescent substance. The solar spectrum shows that about 80 per cent of the Sun is composed of hydrogen and 18 per cent is helium. Of the 92 natural elements, 64 have been identified as present in the Sun. The remainder are undoubtedly there also, but have not yet been identified. However, apart from hydrogen and helium, all remaining elements make up only about 2 per cent of the Sun.

The size of the Sun

From the surface of the Earth, the disc of the Sun measures approximately 32 minutes (60 mins = 1 degree) of arc across its diameter. This angle varies slightly according to the distance between the Earth and Sun (see page 1978) because it is greater at perihelion than at aphelion. It is also possible to determine the angle which the Earth's disc would make at the centre of the Sun (8.8 seconds of arc) and, knowing the diameter of the Earth, it is possible to calculate the distance between the Sun and Earth. This average distance is about 92,948,000 miles, so that a ray of light leaving the Sun takes 498 seconds to reach the Earth. Knowing the distance between the Earth and Sun and also the average measurement of the Sun's disc, it is possible to calculate the diameter of the Sun as about 865,000 miles, or 109 times the diameter of the Earth.

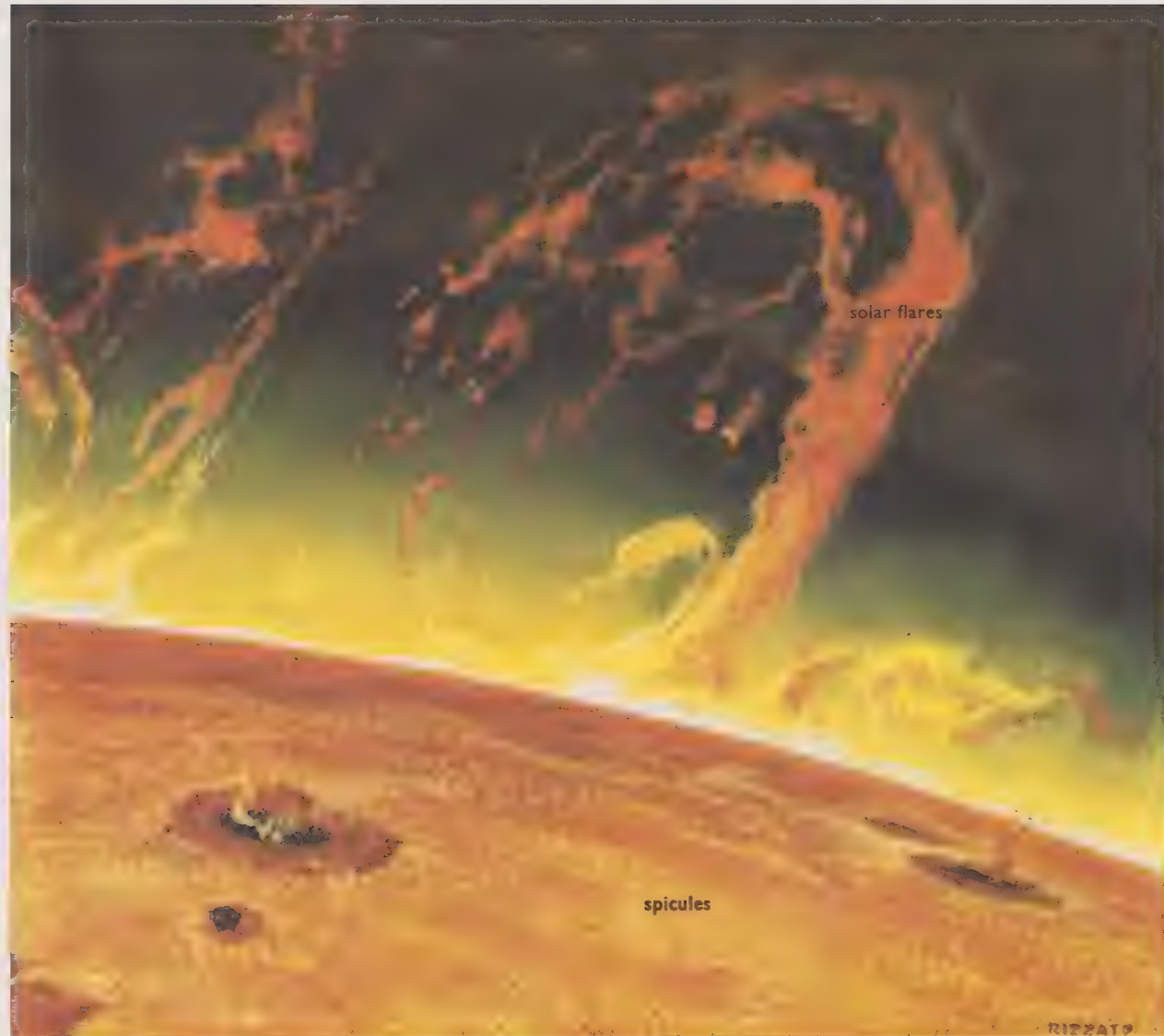
Because the Sun is spherical, it is easy to calculate its volume (V) by the formula $V = \frac{4}{3} \times \pi r^3$ ($r = \frac{1}{2}$ diameter of the Sun).

The density of the Sun

We wish next to find out whether the Sun is more or less dense than the Earth. Since density is mass divided by volume, we need to be able to 'weigh' the Sun. We find the Sun's mass by calculating the pull of the Sun on the Earth; this is the gravitational (centripetal) force which keeps the Earth revolving in its orbit. Then by using Newton's laws of gravitation, our knowledge of the distance from the Sun to the Earth, and the velocity of the Earth in its orbit, we can calculate the mass of the Sun. We find that the mass of the Sun is 333,420 times greater than that of the Earth, or, if the Earth weighed $\frac{1}{3}$ ounce, the Sun would weigh 3 tons. If, however, we compare their volumes (1,306,000 : 1) with their masses (333,420 : 1) we find that the density of the Earth is about four times greater than the density of the Sun. Since the density of the Earth is rather more than 5.5 (compared with water, 1.0) we find that the average density of the Sun is 1.41. This indicates that the Sun consists mainly of gases at high pressure. The information also allows us to calculate the force of gravity at the Sun's surface, and we find that this is approximately 28 times greater than terrestrial gravity.

Solar activity

The undisturbed surface of the Sun is composed of innumerable circular spots of light. These look rather like rice grains, so the name *granulation* is used to describe this appearance. Generally, however, some part of the Sun's surface is affected by one of the disturbances known as solar activity, and the typical



activity that occur in the solar atmosphere

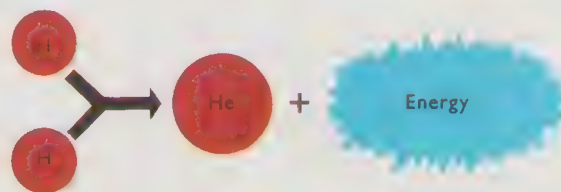
granular surface is replaced by darker or lighter patches.

The most easily observed forms of activity are the sunspots and faculae which affect the photosphere. Sunspots are crater-like depressions which are dark because they are cooler than the usual surface temperature (about $4,000^{\circ}\text{K}$ compared with $6,000^{\circ}\text{K}$). Faculae appear to be large raised blisters which therefore radiate more light than the surrounding surface. Sunspots can usually only be observed through a telescope, but a few very large spots (considered to be more than 25,000 miles in diameter) are visible to the naked eye. (*Warning:* ordinary dark glasses will not provide sufficient protection for observing the Sun, and the only safe way of looking at solar phenomena is to project sunlight through a telescope on to a piece of white card.) There is a distinct cycle in sunspot activity, so that periods of the maximum number of sunspots occur at approximately 11-year intervals. The period of minimum solar activity is known as the period of a 'Quiet Sun', and this should occur in 1964. Sunspots and faculae appear to move across the face of the Sun, and thereby provide us with information about the Sun's own rotation. The greatest concentration of sunspots and faculae occurs in a zone between solar latitude 5° and 45° north and south. The solar activity

which occurs in the chromosphere and corona is less easy to observe, but generally takes the form of leaping flames and jets of incandescent gases which may extend far out into the solar atmosphere.

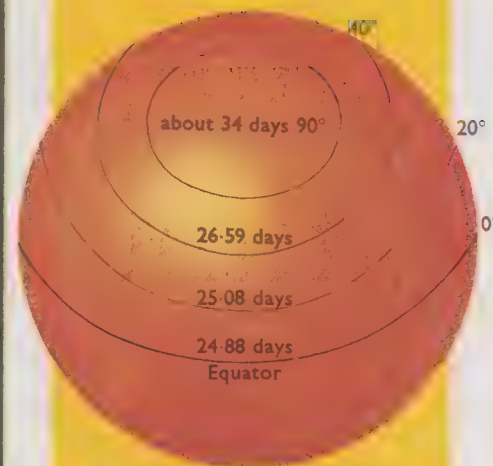
The chromosphere and corona both emit radio waves, and these emissions are considerably affected by solar activity. On Earth they affect the magnetic field and the layers of the ionosphere, giving rise to *aurorae* (Northern Lights or Southern Lights) and deterioration of radio communications. Like the sunspots, the intensity of radio emission follows an 11-year cycle.

The periodic reduction in solar radiation affects air temperatures which, in turn, influences other climatic elements, and this in turn affects crop yields.



The thermonuclear furnace

We know little about what happens in the Sun's interior, but we think that the enormous amount of energy released within it comes from the fusion of two hydrogen nuclei to form one helium nucleus.



The speed of rotation of different parts of the Sun

MOVEMENT OF THE SUN

We have seen that the apparent movements of sunspots allow us to draw certain conclusions about the Sun's own motions. We find, however, that since the Sun is a gaseous body and not rigid like the Earth, different parts of it rotate at different speeds. Thus a point on the Sun's Equator makes one complete revolution in 24.88 days; between the latitudes 10° and 20° this has increased to 25.08 days, and in latitude 45° it is 28.06 days. Towards the poles it becomes increasingly difficult to be accurate, but it seems that near the poles themselves one revolution takes about 34 days.

SOME NUMERICAL FACTS ABOUT THE SUN

Diameter:

about 865,000 miles (109 times that of the Earth)

Mass: 333,420 times the mass of the Earth

Mean density: 1.41

Gravitational force: 28 times that of terrestrial gravity.

Inclination of the axis of rotation to the ecliptic: $82^{\circ}50'$.

Temperature of the interior: about $15,000,000^{\circ}\text{K}$

Temperature of the photosphere: about $6,000^{\circ}\text{K}$

Temperature of the sunspots: about $4,000^{\circ}\text{K}$

THE BEAN



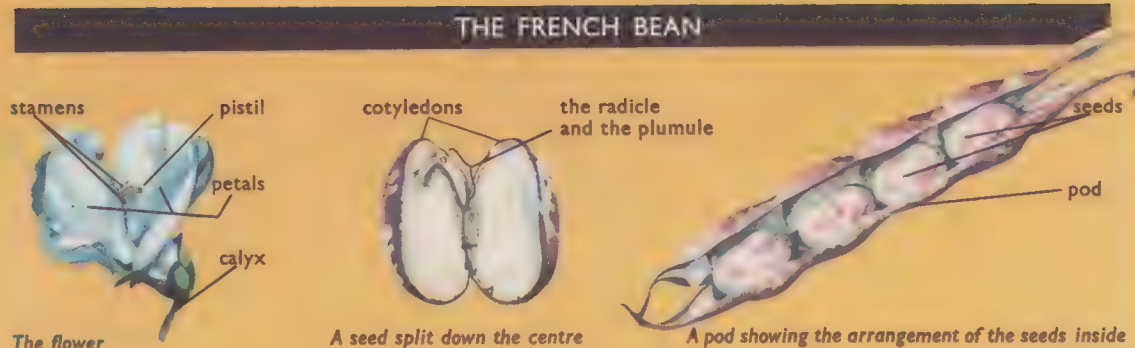
A climbing variety of French bean showing the white flowers and tri-lobed leaves

THE three most important kinds of bean in the world are the soy bean (*Glycine max*), a small, rounded, creamy-white bean about the size of a pea; the French bean (*Phaseolus vulgaris*), a kidney-shaped bean varying greatly in size and colour; and the broad bean, a large, flattened, grey-green bean about three-quarters of an inch long. Although the soy bean has been a major source of food and oil for centuries in Japan and China, it is not widely grown in Europe. Both the other kinds of bean are common in Britain.

The French bean originally came from South America, and about a thousand dwarf and climbing varieties of it have been developed. Both pods and bean seeds can be eaten.

The broad bean originated in Europe and Asia, and grows only in temperate climates. Only the bean seeds can be eaten.

The scarlet and white runner beans (*Phaseolus coccineus*) are also grown in Britain.



We will examine the French bean as our main representative of the bean family. Most varieties have white flowers, arranged in a complicated way, with ten stamens, nine fused together and one free.

The seeds vary in colour from white to dark purple. By splitting a mature seed down the centre it is possible to reveal the two *cotyledons* (which are the food store of the seed and do not function as leaves, as they do in most plants), the *radicle*, or rudimentary root, and the *plumule*, or rudimentary shoot from which the new plant grows when the seed germinates.

The pods of young French beans are usually smooth and green. As they mature, however, many varieties develop a yellow tinge and have a series of bulges along their sides, caused by the swelling seeds inside.

CULTIVATION

French beans are grown as annual plants, the seeds being sown each spring. They are extremely vulnerable to frost and, in consequence, it is better not to sow the seed before all possibility of night frosts is past. In the south of England the middle of May is a suitable date, but in the north it is wise to delay planting until the beginning of June. Even so, a late 'cold spell' can cause havoc.

Commercial growers of French beans almost always grow one of the dwarf varieties. These plants need very little attention and there are varieties selected to produce fresh young beans, or the large full pods required for haricots. In the latter case the plants are left in the fields until all the pods are ripe. They are then harvested mechanically.

Amateur gardeners sometimes prefer the climbing varieties although they are a nuisance to stake.



Young French beans suitable for eating whole

BROAD BEANS

The broad bean plant grows from 2 to 5 feet tall. It has short-petioled leaves, and its pods grow in clusters in the axils of the leaves. Its flowers are rather like those of the French bean, but have black markings. The bean seeds inside the pods grow in a nest of fine white cotton-like fibres.

Unlike other beans, broad beans can stand up to a little frost, but not to hot weather. There are two different kinds: one, which has large seeds, originated in the Mediterranean region; the other, which has small seeds, originated in Asia.

RUNNER BEANS

Two varieties of runner bean are grown in Britain; they are related to the French bean, and like it originated in South America.

The scarlet runner is sometimes grown for its brilliantly coloured flowers, which are very decorative. It has coarse pods and large seeds, both of which are eaten. The other variety, the White Dutch runner, has white flowers. Runner beans are climbing plants, and are a familiar sight growing vigorously up poles in kitchen gardens.

WEATHER FORECAST

The rainy weather which has reached the Marches will spread to the whole country

NEW TACTICS

Two questions are being asked in London tonight: why did we lose at Bannockburn, and what will the political consequences be in England and Scotland?

There are, of course, obvious reasons for the loss of the battle: the low morale after the slaying of Henry Bohun; the long and exhausting march undergone before the battle; the absence of the mighty Thomas of Lancaster and other major barons; and the fact that King Edward II is not such an experienced military leader as his father. But one tactical fact of immense importance has emerged – that cavalry can no longer charge down well-disciplined and well-led foot-soldiers. Twelve years ago, at the battle of Courtrai, the infantry of Flanders massacred the flower of the French cavalry. Yesterday the English cavalry came to grief on the Scots' hedgehog-like shiltrens.

It seems that cavalry must have the support of archers before they can hope to succeed against well-disciplined infantry. The English cavalry had no such support at Bannockburn.

POLITICAL CONSEQUENCES

The position of Thomas of Lancaster has become even more powerful. Three years ago he was leader of those barons who made

the King accept certain Ordinances designed to limit the power of the Royal Household Offices and reinstate the position of the Great Offices of State like that of Chancellor and Treasurer. This was because the King had been attempting to rule through his Chamber and Wardrobe, by-passing the Exchequer and Chancery, offices traditionally held by barons. It seems that there is nothing now to prevent Lancaster and the more extreme barons like Warwick from taking an increasing share in the government of the kingdom.

It also seems that although Scotland was given to Edward I by John Balliol, neither Edward II nor Thomas of Lancaster are likely to be able to dispose of the so-called King Robert of Scotland.

Obituary

THE EARL OF GLOUCESTER AND OF CLARE

Gilbert de Clare, 9th Earl of Gloucester and 10th Earl of Clare, and nephew of the King, will not only be missed in the West Country, but by all moderate politicians. Though a Lord Ordainer, he acted as a brake on his more impetuous colleagues like Guy, Earl of Warwick, and Thomas, Earl of Lancaster. He consistently advocated a moderate course in the baronial dealings with the King.

Gilbert de Clare was only 23 when he met his death. Yet he was perhaps the most influential baron in England, greatly respected by King and magnates alike.

His father, the famous 8th Earl of Gloucester, married Alice of Angoulême, niece of King Henry III. He was a prominent member of the baronial party led by Simon de Montfort.

The son seemed destined to play a similarly important part in the political life of the country – but fate intervened. The manner of Gilbert de Clare's death was a tribute to his great spirit and courage.

W.A.

The rise of Robert Bruce

By Christopher Falkus

From the welter, bloodshed and strife of Scottish politics a strong man has emerged – Robert Bruce. He has not only united Scotland, but has led the Scots to victory against their greatest enemy.

For years this son of Robert Bruce, Earl of Carrick, has been a king without a kingdom. His claim to the throne comes from his descent from the second daughter of King David I. In 1292 this claim was overruled by Edward I, King of England, in favour of John Balliol, a descendant of David's first daughter.

BALLIOL'S HOMAGE

Balliol paid homage to King Edward I, and acknowledged him as his Overlord. The great Scottish lords resented this, and an opposition party was formed. They persuaded Balliol to oppose certain demands made by King Edward I, and in order to enforce them Edward invaded Scotland in 1296. Balliol resigned the kingdom to Edward and fled.

But the Scots did not accept this verdict. A major rebellion under William Wallace was crushed at Falkirk in 1298, but the Scots appointed two guardians to rule until they had a king of their own. One guardian was John Comyn (the Red Comyn), Lord of Badenoch, son of John Comyn (the Black Comyn). The latter had been a

candidate for the throne before Edward chose Balliol. The second guardian was Robert Bruce. The Red Comyn was the son of Balliol's sister, and Bruce, who had his eye on the throne, decided to dispose of Comyn who still supported Balliol's line.

In 1306 Bruce slew Comyn in a church, for which he was condemned and excommunicated by the Pope. But Bruce managed to get himself crowned King of Scotland. With many Scots against him and the English in possession of many castles, his cause looked hopeless. But he made several daring raids into England, and in 1312 he penetrated as far as Durham and Hartlepool. His supporters grew.

BRUCE'S SUCCESSES

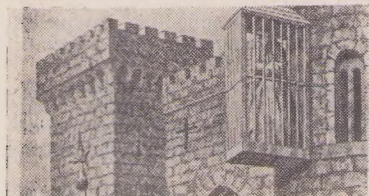
His position in Scotland improved steadily, and his forces managed to take many English-held castles. In 1311 he captured Linlithgow and Dumbarton, in 1313 Perth, Edinburgh and Roxburgh.

The campaign which ended at Bannockburn was an attempt by King Edward II to put a stop to Robert Bruce's spectacular progress in Scotland and also to his raids into England.

At this moment only Bothwell and Berwick are left to the English in Scotland.

People in the news

Below: the single combat between Henry de Bohun and Robert Bruce which ended fatally for the former; left: an old picture showing Lady Bruce, Robert Bruce's sister, in a cage where she had been put by order of King Edward I; below left: King Edward II; right: Thomas, Earl of Lancaster



You write—thousands read!

New Line

DEAR EDITOR—Before the 16th April this year, passengers travelling from Melbourne to Sydney had to change trains at Albury (on the border of New South Wales and Victoria) because the railway tracks were different widths in each state. Victoria's were 5 feet 3 inches, and New South Wales' 4 feet 8½ inches wide.

Now the two cities are linked by a new line, and two famous trains, the Southern Aurora and the Spirit of Progress, are now making this run.

Goods trains have been using the line for some months, which has greatly reduced the cost of sending goods from one state to another.

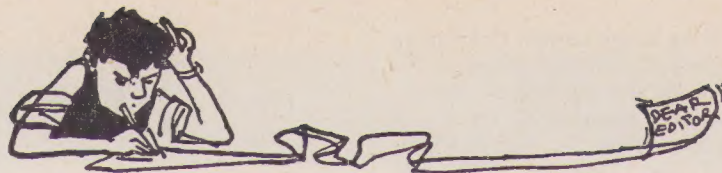
Andrew Reynolds,
666 Canterbury Road,
Vermont, Victoria,
Australia.

A Faithful Hound

DEAR EDITOR—During a recent holiday in Wales, I visited the old town of Beddgelert. In the 13th century Llewelyn, prince of North Wales, had a palace here and used to go hunting with Gelert, his faithful hound.

There is a legend that one day Gelert mysteriously disappeared and Llewelyn went hunting without him. When Llewelyn returned, the truant joyfully sprang to meet his master, but the dog was stained and smeared with blood. Alarmed, the prince hastened to find his young son, but the cot was empty and the bedclothes and floor were covered with blood.

The frantic father plunged his sword



into the hound's side, thinking Gelert had killed his son. But the dog's dying gasp was answered by a child's cry. Llewelyn searched and found his son unharmed with, nearby, the body of a huge wolf that Gelert had fought and killed.

The prince was filled with remorse, and is said never to have smiled again.

Vernon Richardson,
116 Queens Road,
Hinckley,
Leicestershire.

Words . . .

DEAR EDITOR—In her letter, Helen Ratcliff tells us not to end a sentence with a preposition (*Knowledge News* dated 18th August). To do so is, in fact, a grammatical impossibility. When *off*, *with*, *by* or *for* ends a sentence, it is, strictly speaking, functioning as an adverb, not as a preposition.

David Doig (age 13),
83 Broadway, Duffield,
Derbyshire.

. . . words . . .

DEAR EDITOR—In his book, *Plain Words*, Sir Ernest Gowers says: 'It was, I believe, Dryden who invented the rule that prepositions must not be used to end a sentence with. No one else of importance has ever observed it, and it is now exploded.'

P. Dapré,
220 Gunnersbury Avenue,
Acton, London, W.3.

. . . words

DEAR EDITOR—An even more outstanding example of 'preposition piling' was written by Morris Bishop and published in the *New Yorker*. Here it is:

I lately lost a preposition;

It hid, I thought, beneath my chair
And angrily I cried, 'Perdition!
Up from out of in under there.'

Correctness is my *vade mecum*,
And straggling phrases I abhor,
And yet I wondered, 'What should he
come
Up from out of in under for?'

Peter Benson,
64 Grove Road,
Sheffield 7.

Magic Meetings

DEAR EDITOR—The famous Hell Fire Caves are at West Wycombe, near my home. They were excavated about 200 years ago by Sir Francis Dashwood, Lord le Despencer, Chancellor of the Exchequer in 1762-3. The caves were used for the meetings of the 'Monks of Medmenham' or, as they were sometimes known, 'The Knights of St Francis of Wycombe'. They often met at Medmenham Abbey, a few miles away, where they would dress as Franciscan monks and indulge in every kind of vice and the art of black magic.

The members of the Hell Fire Club included many famous and well-known

men, including peers, members of Parliament, poets, the Lord Mayor of London, the Archbishop of Canterbury's son, William Hogarth, and even Benjamin Franklin visited the club on several occasions.

The club started in about 1750 but broke up in about 1763, partly as a result of a political disagreement and partly because of a strange practical joke, played by a certain John Wilkes. He dressed a baboon up as the devil, and released it during a Black Mass service; it leapt on to the back of Lord Sandwich who ran out of the chapel terrified.

The caves run under West Wycombe hill, on top of which is a church, built by Sir Francis. They consist of a long vaulted passage, broken up by several caves and catacombs. The banqueting hall is one of the largest man-made chalk caves in the world. The underground river, named Styx, flows past the inner temple, where only the twelve inner brothers were allowed. Today all these caves are open to the public.

Stephen Coniam,
19 Ashley Drive,
Tylers Green, Penn,
Buckinghamshire.

The Crazy English

DEAR EDITOR—I have noticed that in Brain Box sometimes we are asked to find rhyming words that are spelt differently. English must be a very hard language to learn because it lacks logic.

Take, for example, the made-up word *ghoti*. A thousand guesses at the pronunciation of this word would not succeed. It is pronounced *fish*. The 'gh' forms the sound 'f', as in *enough*; 'o' forms the sound 'i', as in *women*; and 'ti' forms the sound 'sh' as in *station*.

This would certainly baffle any foreigners.

Marjo Hulstede,
Manar Station,
Braidwood,
New South Wales,
Australia.

Royal Religion

DEAR EDITOR—I was interested to see the statement in *Knowledge News* recently that in England the Queen is an Anglican and in Scotland she is a Presbyterian. I know this is correct, but it does seem a stupid situation. Surely our monarch should be allowed to choose her own religion?

We do not live in ancient times, when Protestants would be persecuted by a Roman Catholic king; we live in an age of democracy and religious toleration.

Another aspect of this unnecessary connection between Church and Government is the representation of only the Anglican Church in the House of Lords.

Alasdair Smith,
Sandwichhill Schoolhouse,
Sandwich,
Isle of Lewis.

A Matter of Rank

First soldier: 'The General looks angry today.'
Second Soldier: 'No wonder. He's just received a letter marked *Private*.'

Judith Sharman,
71 Liverpool Road South,
Maghull, Liverpool.

Dirty Look

'Your future looks rather indistinct,' muttered the gypsy palmist.
'What do you recommend?'
'Soap.'

Graham Payne (age 13),
51 Lambourne Crescent,
Sheerwater,
Woking, Surrey.

How well did you read the historical newspaper?

1. Near which great castle was Bannockburn fought?
2. Which English magnate was noticeable by his absence from the battle?
3. What were the Scottish formations of pikemen known as?
4. Which young English earl was killed leading a charge of the English cavalry?
5. What was the date of the Battle of Bannockburn?
6. What was the name given to the group of lords who tried to reform King Edward II's government?
7. Two great Offices of State are mentioned. What are they?
8. Which leading baron seized the King's favourite, Piers Gaveston?
9. Who was King of Scotland before Robert Bruce?
10. Who led the Scottish rebellion that was crushed by Edward I in 1298?
11. Which 'guardian' of Scotland did Bruce murder in 1306?
12. Which Pope moved the papal residence from Rome to Avignon?

ANSWERS

1. Stirling.
2. Thomas of Lancaster.
3. Shiltrens.
4. Earl of Gloucester.
5. 24th July 1314.
6. Lords Ordainers.
7. Treasurer and Chancellor.
8. Earl of Warwick.
9. John Balliol.
10. William Wallace.
11. The Red Comyn.
12. Clement V.

BRAIN



BOX

1. PILGRIMS
PROGRESS
7 5 2 1 3 2 8 2

Can you solve this sum and thereby turn Bunyan's famous title into figures? (All the numbers 1 to 9 are used and L is less than O.)

2. There once was a chemist of —,
Who invented the perfect —;
But its fume was so —,
It made you —,
And you passed into an
exquisite —.
This is a newly-made limerick

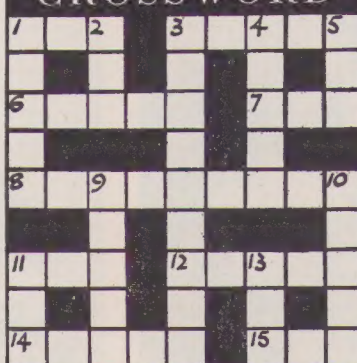
with the rhyme words omitted. Can you supply them? (The town where the chemist lived is in Norfolk.)

3. (Try to do this in your head, not on paper.) Imagine an equilateral triangle of dots. There is one dot at the apex, then two beneath that, then three in the next row, and so on, one extra dot for each parallel row. Altogether there are 66 dots. How many dots are there in the base row?

ANSWERS

1. 38,256,871; 36,956,411.
2. Cromer, aroma, heady, unsteady, coma.
3. Eleven.

HIGH-SPEED CROSSWORD



Solution next week

SOLUTION TO LAST WEEK'S CROSSWORD

ACROSS: 1, Mime; 3, Ebbs; 7, Streamers; 8, Oatcake; 11, Stalemate; 12, Sped; 13, Stay.
DOWN: 1, Mist; 2, Marmalade; 4, Breakfast; 5, Sash; 6, Marcher; 9, Isis; 10, Deny.

Clues Across

1. Sphere (3).
3. Get within your grasp (5).
6. Not sour (5).
7. First this for those who have been hurt (3).
8. People you do not know (9).
11. Much — about Nothing (3).
12. Form of expression in language (5).
14. Strong force representing the law (5).
15. Greek island (3).

Clues Down

1. Found in the desert luckily (5).
2. Industrious insect (3).
3. Able to keep (in memory, for example) (9).
4. Precious stone (5).
5. Brick holder (3).
9. Outbreaks such as 14 across might settle (5).
10. Tanks (for petrol, for example) (5).
11. High mountain (3).
13. Writing fluid (3).

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for British Farms' which trained and placed boys on the land to help the war effort. Today three farm training centres are still in operation. The YMCA also helps young immigrants and arranges a welcome and sometimes even a job for them.

The YWCA grew up independently of the YMCA, and it was only in 1887 that a number of separate women's organisations joined forces to form the YWCA as we know it today. Apart from its religious character, the original work of the YWCA was to provide classes in commerce and secretarial subjects. In 1884 the YWCA added inexpensive cooked lunches to its other services in revulsion against the sight of young office girls eating sandwiches in the streets during their lunch hours. Today girls' hostels exist in over 70 countries, while in Great Britain there are 121 hostels accommodating 4,600 girls.

The Boys' Brigade was founded in 1883 by Sir William Smith to enable the benefits of Sunday School to continue during the week. He decided to band together Sunday-School boys over the age of 12 into 'Brigades' in which they would be taught drill, physical exercises, obedience, punctuality, and cleanliness. The first company had Smith himself as 'captain', with two friends as 'lieutenants' and 28 boys. Six of the boys were later promoted to the rank of 'NCO' and the familiar uniform of today was adopted. Companies were formed all over Britain and soon sprang up throughout the world. Their activities expanded to include athletics, first aid, fire drill, and they began to form their own brass bands. Today there are 185,000 members in Great Britain and a world membership of 255,000.

The Boys' Brigade stimulated many similar movements which began to develop about the same time. Among these were the Church Lads' Brigade, the Jewish Lads' Brigade, the Catholic Lads' Brigade, and The Boys' Life Brigade.

The Girls' Friendly Society was founded in 1875 by Mary Townsend. Its purpose was 'to unite girls and women in a fellowship of prayer services and purity of life for the glory of God'. It provided friendship for thousands of girls who were lonely and working far from home. Its meetings were for a few hours every week in the home of some philanthropic lady. It has always been closely connected with the Anglican Church and 10 years after its foundation was established in every diocese in England and Wales. There has been a rapid decline in this movement in the 20th century. Nevertheless there are still 23,000 members in Great Britain.

Military movements

Pre-Service Corps existed for both boys and girls in all three Services in Great Britain. The Sea Cadet Corps and the Army Cadet Corps for boys began in the late 19th century, while the Air Training Corps began after the First World War. The girls' pre-service movements sprang up after National Service for women was introduced in 1942. Today 8,000 girls belong to pre-service training corps, while the figure for boys is 170,000.

Apart from these major military movements both the British Red Cross Society and the St John's Ambulance Brigade have branches for young people. The emphasis of both is on first aid, and the junior branches were invaluable during the Second World War.

'Countryside' movements

Several young farmers' groups had been in existence for some years before the National Federation of Young Farmers was formed in 1932. Their original object was rearing, selling, and showing livestock, and holding lecture courses in agricultural subjects. In fact they seek to extend adult farmers' activities to young people and have competitions in, for example, milking, ploughing, cake making, thatching, and sheep shearing. Some of their members live in towns, and summer courses on the land are held for them. In 1948 delegates from similar organisations all over the world arrived in London for an international conference. Today there are well over 50,000 members in Great Britain with ages ranging between 10 and 25.

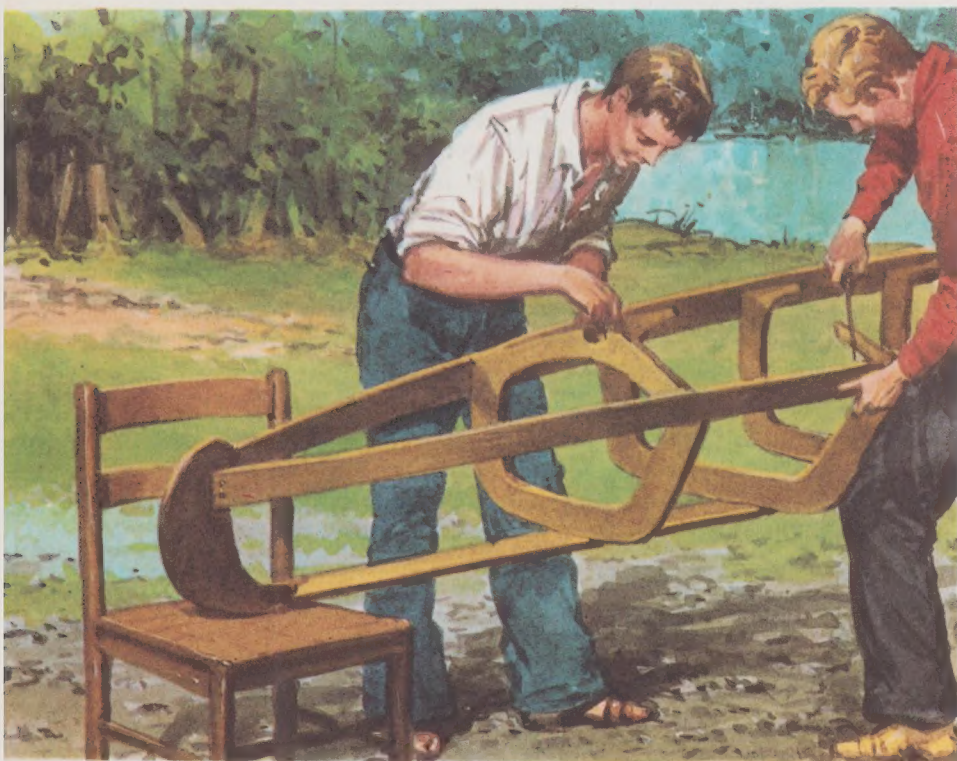
The Conservation Corps was founded in 1959 to help to safeguard wildlife in the British countryside. In 1963 another conservation youth movement was founded – the Wildlife Youth Service. This organisation consists of 12,000 young people who are interested in animals, and want to do something about the threat to the world's wildlife.

Political movements

There are junior branches of all the main political parties in Great Britain – Young Conservatives, Socialists, and Liberals. The object is, of course, to enable members to hold discussions and listen to lectures, often given by prominent politicians of the particular party.

Sea Scouts doing the work they love most – sailing





Members of the YMCA building a canoe

The Youth Hostel Association

The Youth Hostel Association was founded in Great Britain in 1929, although in Germany it had been in existence for some years, with the purpose of providing accommodation for young people wishing to explore remote districts. It rapidly spread all over the world and today enables people of all nationalities to visit cheaply countries which perhaps they would otherwise never be able to see. They cater for the active and energetic traveller – in many hostels people arriving in cars are simply not allowed to stay.

Scouts and Guides

The Boy Scouts and the Girl Guides and their affiliated movements are by far the largest youth associations in the world. Scouting began almost by accident. Lord Baden-Powell, whose name is linked imperishably with the Scout movement, was vice-president of the Boys' Brigade and a great friend of Sir William Smith, the founder. Sir William asked him to draw up a list of activities that he thought would be attractive to boys. The suggestions were published in the *Boys' Brigade Gazette* in 1906, but in the course of his deliberations Baden-Powell had become interested in forming a wider movement. In 1907 he began work on a handbook called *Scouting for Boys*, and decided to run a camp to put into practice all the healthy 'outdoor' schemes he had evolved. The camp was a great success, and in 1908 *Scouting for Boys* was published. All over Great Britain youth clubs adopted the suggestions contained in the book. Other groups formed themselves into independent patrols and became the first Boy Scouts. Baden-Powell started a weekly publication called *The Scout* through which he guided the move-

ment, and in 1908 the familiar uniform was adopted. The following year the first Scout rally was held at Crystal Palace, and Baden-Powell took the salute as Chief Scout of the 10,000 boys who attended. Also at the rally (though not officially invited) was a small band of girls who called themselves Girl Scouts. In 1910 they became the nucleus of the Girl Guides, with Baden-Powell's sister, Agnes Baden-Powell, as Chief Guide.

Scouting has developed many branches: wolf cubs for boys aged 8 to 11; Land Scouts, Sea Scouts, and Air Scouts for boys aged 11 to 15; Senior Scouts for those aged 15 to 18; and Rover Scouts for those 18 or over. The accent of the Scout movement is on the 'outdoor' way of life coupled with the traditional 'Victorian' virtues, including observation, obedience, health, endurance, chivalry, patriotism, and life saving. Many of these activities are practised on regular camping holidays.

Scouting caught on as few movements have ever done, and 22 countries were represented at the first World Scout Jamboree in 1920. At this meeting Lord Baden-Powell was dramatically and spontaneously proclaimed Chief World Scout. Jamborees are held every four years. At the Jamboree held in 1959 in the Philippines, 12,000 Scouts attended from 70 countries. The Jamboree held recently in Greece was attended by 1,500 Scouts from Great Britain alone. The present Chief Scout is Sir Charles Maclean.

The Girl Guides is a similar movement to the Scouts. Their junior branch is called the Brownies and their senior branch the Rangers. In addition to camping and the regular activities, much attention is given to typical female activities. For her 'Little House' emblem the Guide must pass tests in cookery, needlework, laundry, child nursing, toy making, and housecraft. Its prestige can be judged from the fact that both Queen Elizabeth II and Princess Margaret were Girl Guides in their younger days. The Chief Guide today is Lady Olave Baden-Powell. Over 50 countries sent members to the last world conference of Guides held in Greece in 1960.

Today there are over 9 million Scouts in the world and 5½ million Guides. There are 518,000 Scouts in Great Britain alone and even more Guides – 530,000. Special provisions such as 'Post Scouts and Guides' are made for those who are physically handicapped from joining patrols.

Members of the Junior Red Cross packing disaster relief kits

